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John Morris Arboricultural Consultancy

Tree Risk Management | Trees, Planning & Development | Expert Witness | Arboricultural Clerk of Works | Government Support

Client: St Marys Medical (Tallaght) Ltd
Site: Nursing Home Development
Greenhills Road
Tallaght
Co. Dublin

Date: 21st January 2022
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ARBORICULTURAL IMPACT ASSESSMENT & METHOD STATEMENTS

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Purpose of Document

This report provides an assessment of trees on land owned by St Marys Medical (Tallaght) Ltd in accordance with the guidelines outlined in BS5837:2012 *Trees in relation to design, demolition and construction – Recommendations.*

It provides an overview of the constraints and opportunities posed by trees on or within influencing distance of the site and demonstrates how existing trees have influenced the development proposal.

It includes:

- A **Tree Schedule** that provides information for each tree;
- A **Tree Constraints Plan** that illustrates the location and constraints posed by trees;
- An **Arboricultural Impact Assessment** that considers the impacts of the proposed development to those trees, including proposals for arboricultural mitigation and improvements;
- An **Arboricultural Method Statement** that outlines how retained trees will be protected during construction, and;
- A **Tree Impact & Protection Plan** that illustrates the impact of the proposal upon trees and protection measures that should be adopted during construction.

The information contained within this report allows South Dublin County Council to assess tree related issues associated with the development proposal.

Executive Summary

The proposed development will comprise:

(a) construction of a 4 storey nursing home building consisting of (i) 106 no. bedrooms (with ensuite); (ii) associated resident's welfare facilities; (iii) administration areas and staff facilities; and pharmacy proposed at ground floor level.
(b) part 4 and part 5 storey Independent Living Units for Older People arranged in 3 Blocks comprising 60 x 2 person/1 bedroom units total.
(c) The development will include communal open space and landscaping (including new tree planting and tree retention), 30 no. car parking spaces; and secure and covered bicycle parking spaces.
(d) The development will be served by a new pedestrian and vehicular access from Old Greenhills Road through existing boundary wall; and
(e) The development includes landscaping, boundary treatments (including walls and railings to southern and western boundaries), an ESB Substation, SuDS drainage; road infrastructure and all ancillary site works necessary to facilitate the development.

A tree survey of the site was undertaken in accordance with BS5837:2012 *Trees in relation to design, demolition and construction – Recommendations* independently and without knowledge of any future development proposals. The survey identified 21 individual trees and three groups of trees, which have been categorised as follows:

2 of high arboricultural quality	(Category A)
5 of moderate arboricultural quality	(Category B)
17 of low arboricultural quality	(Category C)
0 of poor arboricultural quality	(Category U)

The design and layout of the site has been influenced by local planning policy in relation to trees, as detailed in South Dublin County Development Plan (2016-2022) and South Dublin County Tree Strategy – Living with Trees (2015-2020). The aim has been to include those arboricultural features that are capable of providing a substantial future contribution, in terms of their amenity, landscape and ecological value, and those that contribute to the existing landscape character of the local area.

The layout of the development proposal has been designed to ensure the protection and incorporation of mature high and moderate value trees located to the north west of the site, which have been identified as an important arboricultural features, and trees located on private lands to the west and south of the site that contribute to the existing landscape character. These trees have been incorporated into the design layout as key features to create a harmonious relationship between the existing natural green infrastructure and the new built environment.

The development proposal will require the removal of four individual category C trees and one

category C group of trees, all of low arboricultural quality. To mitigate the removal of these low quality arboricultural features, a landscape plan submitted as part of the application proposes a diverse mix of new trees and vegetation across the site to function in harmony with the new development. This new planting will significantly improve species diversity and increase future canopy cover in the local landscape.

The following measures are required to ensure the protection of retained trees during construction:

- Tree Protective Fencing & Barriers
- Construction Exclusion Zones
- Temporary Ground Protection
- Permanent Ground Protection
- Pollution Control
- Specialist Working Methods
- Arboricultural Monitoring & Supervision

CONTENTS

ATTACHMENTS

DOCUMENT TITLE	DOCUMENT REFERENCE
TREE SCHEDULE	21-234-01
TREE CONSTRAINTS PLAN	21-234-02
TREE IMPACT & PROTECTION PLAN	21-234-03

1. INTRODUCTION

Instruction

1.1. Instruction was received from St Marys Medical (Tallaght) Ltd on 16th October 2020 to undertake a tree survey and prepare an arboricultural report in connection with a planning application for the construction of a nursing home comprising 112 ensuite bedrooms, 108no. one bedroom apartments and facilities, including pedestrian and vehicular access, landscaping, services, boundary treatments and all associated site works on land within the grounds of St. Marys Priory, Tallaght with a site area of c. 0.99Ha.

Scope

1.2. The survey has been carried out in accordance with BS5837:2012 *Trees in relation to design, demolition and construction – Recommendations.*

1.3. The information collected during the survey has been used in the preparation of this report in connection with a planning application.

Site

1.4. The site at St Marys Priory (hereinafter referred to as 'the Site') comprises a grass field that is bound by TU Dublin Tallaght Campus to the north, Greenhills Road to the east and St Marys Priory to the south and west.

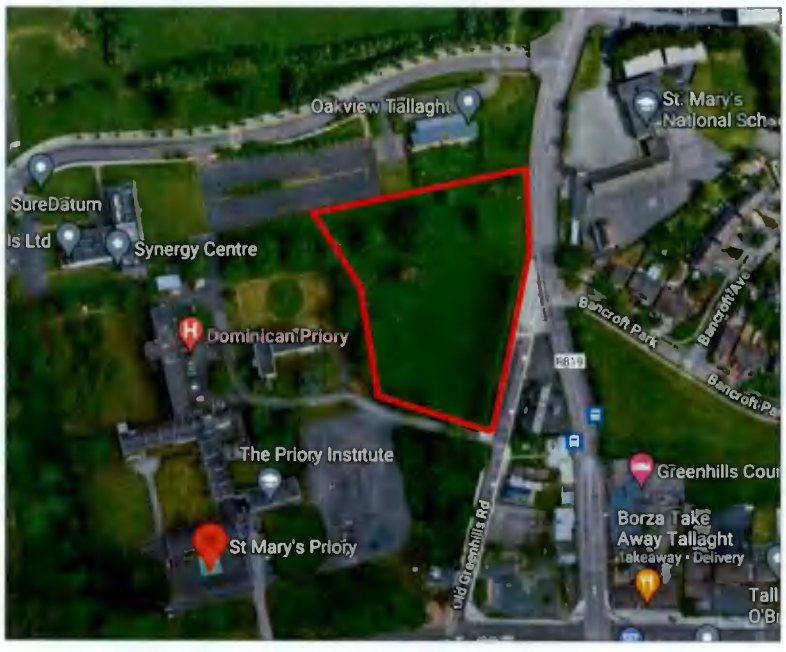


Figure 1. Site application boundary outlined in red (Source: Google Earth, 2021).

2. TREE SURVEY

Site Visit

2.1. The tree survey was undertaken on 14th October 2020.

2.2. Details of the survey methodology and assessment criteria can be found in Appendix 1.

2.3. A copy of the survey data can be found in the Tree Schedule (Ref: 21-234-01) attached to this report.

2.4. The extent of the tree survey has been marked on the Tree Constraints Plan (TCP) (Ref: 21-234-02) attached to this report

2.5. The tree survey considered all trees that have the potential to be impacted by any development proposal including those outside the application area, but within influencing distance.

2.6. The above ground constraints posed by canopy spread are plotted as a continuous line around the tree and shaded in the corresponding BS5837 retention category colour, whilst the below ground constraints posed by the Root Protection Area (RPA) have been plotted as a continuous magenta line with the text RPA inscribed.

2.7. The purpose of the tree survey was to provide guidance to the design team on the constraints and opportunities posed by trees to inform the design and layout of the Site.

2.8. The results of the survey allow the opportunity to balance the retention of significant trees against the opportunity to enhance the existing tree stock through proactive management.

2.9. A summary assessment of the tree quality is contained in Table 1.

Table 1. Overview assessment of tree quality.

	Category A	Category B	Category C	Category U	Total
Trees	2	4	16	0	**22**
Groups	0	1	1	0	**2**
Hedges	0	0	0	0	**0**
Total	**2**	**5**	**17**	**0**	**24**

Description of site

2.10. The main arboricultural features of the site include large mature Lime *(Tilia x Europea),* Horse chestnut *(Aesculus hippocastanum)* and Sycamore *(Acer pseudoplatanus)* to the north, a linear group of mature Lombardy poplar *(Populus nigra 'Italica')* along the eastern boundary at Greenhills Road and early mature and mature Cherry *(Prunus sp.),* Lawson cypress *(Chamaecyparis lawsoniana)* and Leylandii *(x Cupressocyparis leylandii)* along the southern and western boundaries.

2.11. The mature Lime have been identified as category A trees of high arboricultural value at the peak of maturity with a minimum useful life expectancy of 40 years, that are capable of

providing a significant future contribution in terms of their amenity, landscape and ecological value. They are good examples of their species and prominent trees in the local landscape.

2.12. The mature Horse chestnut were observed to be poor physiological and structural condition with advanced stage infection of Horse chestnut bleeding canker *(Pseudomona syringae pv. aesculi)* with large cankers, lesions and exudates to the main stem and large primary limbs, stem girdling, basal decay, deadwood and significant crown dieback. Due to stage of infection these trees are now low quality trees in the senescence stage of their life with a minimum useful life expectancy of 10 years.

2.13. Two further trees are located in the northern section of the site. These include a mature Weeping ash *(Fraxinus excelsior 'Pendula')* that was observed to have Ash Dieback *(Hymenoscyphus fraxinea)* and a mature Monterey cypress *(Cupressus macrocarpa)* in severe physiological and structural decline.

2.14. Individually, the mature Sycamore were identified as low quality trees, however a cohesive arboricultural feature they provide mature canopy cover and are a prominent feature in the local landscape.

2.15. The linear feature of Lombardy poplar along the eastern boundary were observed to be in fair condition and currently offer mature canopy cover and visual amenity from Greenhills Road. In an urban environment, Lombardy are generally regarded as a short lived species that is susceptible to windthrow and stem failure in older age and therefore, these trees have been identified as category C trees of low arboricultural quality with a minimum useful life expectancy of 10 years.

2.16. The Cherry and Cypress to the south and west of the south were also observed to be in fair condition. Despite their low individual quality, these trees form part of the mature landscaping scheme at St Marys Priory and provide immediate mature screening and enclosure to the site.

3. ARBORICULTURAL PRINCIPLES

Trees and Development

3.1. Trees provide a multitude of economic, environmental and social benefits to individuals and communities including (but not limited) to visual amenity and landscape value, ecosystem services and habitats for local wildlife. Trees can also hold historic and cultural importance by providing links to the past that create a sense of place and belonging.

3.2. They are living, self-optimising, mechanical organisms that grow in and react to the environment in which they are located and are capable of being wounded or infected by objects or other organisms that can cause a decline in health or result in death.

3.3. Development proposals that will impact trees should consider the value and contribution made by those trees, the impacts of development activity upon their health and an assessment of future conflicts that may arise between trees and the development proposal.

Below Ground Constraints

3.4. Soils contain organic and mineral material, air and water that provides a medium essential for root growth.

3.5. The physical properties of soils including texture, porosity and bulk density can greatly impact the availability of water, nutrients and oxygen in the soil available to support the function and growth of tree roots.

3.6. Protection of the soil environment in which trees grow is therefore essential to ensure tree vitality.

3.7. Tree roots provide support and anchorage and allow the uptake and transport of water, nutrients and oxygen for tree function and growth. Roots are commonly found in the upper 600-1000mm of soil, however depth can vary significantly depending on soil and local site conditions. Typically, tree root systems comprise a network of lateral roots that provide structural support and smaller fibrous roots that function in the uptake of water, nutrients and oxygen.

Impacts of Construction & Development

3.8. The processes of construction including the movement of machinery and equipment near trees can cause soil compaction that can starve roots of oxygen and water, resulting in tree decline or death. Increasing ground levels near trees can cause similar impacts, whilst belowground soil excavations can damage root bark or lead to root severance and impair structural stability. Further impacts include (but are not limited to) contamination of soils by toxic substances such as cement or chemicals and root desiccation due to inadequate protection during exposure.

Root Protection Areas

3.9. In accordance with BS5837, the Root Protection Area (RPA) indicates the notional minimum area of ground around a tree deemed to contain sufficient roots and rooting volume to avoid adverse physiological or structural impairment and to support future tree function, growth and health.

3.10. The RPA is calculated in accordance with Section 4.6 of BS5837 and is summarised in Appendix 2.

3.11. The RPA is plotted as a continuous circle centred on the base of the stem, however where pre-existing site conditions such as the presence of built structures, changes in topography, soil type and structure or past management are likely to act as barriers, or alter normal distribution, BS5837 allows modifications to the shape of the RPA can be made based upon sound arboricultural assessment.

3.12. The default position should be that no development works occur inside RPAs, however in accordance with BS5837 when there is an overriding justification, it may be appropriate to implement specialist methods of construction or technical solutions that will reduce or eliminate the impact to roots and soil environments.

3.13. Additionally, where an area of RPA is lost, it should be demonstrated that the tree can remain viable with the area lost from encroachment compensated elsewhere contiguous with its RPA, based on the species, age, condition and past management of the tree, pre-existing site conditions and nature of operations proposed is undertaken.

Above Ground Constraints

3.14. Tree stems and crowns can restrict the availability of space on a development site that may result in conflicts between trees and the new built environment. The design and layout of a site should take into consideration the presence of tree canopies, as well as individual species characteristics and future growth requirements in order to create a harmonious relationship between trees and the new built environment.

4. PLANNING POLICY, STATUTORY & NON-STATUTORY CONSIDERATIONS

Planning Policy

4.1. The National Planning Framework 'Project Ireland 2040' and National Development Plan (2018-2027) underpin planning policy across Ireland. These documents recognise the need to manage future growth in a planned, productive and sustainable way.

4.2. At the heart of Green Infrastructure Planning is to protect, preserve and enhance national capital by:

> *"protecting and valuing important and vulnerable habitats, landscapes, natural heritage and green spaces".*

4.3. The Site falls within the jurisdiction of South Dublin County Council (SDCC), which has a statutory obligation to ensure that provision is made for the protection of trees, woodlands and hedgerows under the Local Government Planning and Development Act (2000), through implementation of a Development Plan. The current plan for South Dublin is the **South Dublin Development Plan (2016-2022).**

4.4. The South Dublin Development Plan (2016-2022) provides guidance for trees in relation to proposals of development as follows:

South Dublin County Council Development Plan 2016-2022

Chapter 8 | Green Infrastructure

GREEN INFRASTRUCTURE (G) Policy 2 Green Infrastructure Network

G2 Objective 9:

"To preserve, protect and augment trees, groups of trees, woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and by incorporating them within design proposals and supporting their integration into the Green Infrastructure network".

G2 Objective 11:

"To incorporate appropriate elements of Green Infrastructure e.g. new tree planting, grass verges, planters etc. into existing areas of hard infrastructure wherever possible, thereby integrating these areas of existing urban environment into the overall Green Infrastructure network".

GREEN INFRASTRUCTURE (G) Policy 6 New Development in Urban Areas

G6 Objective 1:

"To protect and enhance existing ecological features including tree stands, woodlands, hedgerows and watercourses in all new developments as an essential part of the design process".

Chapter 9 | Heritage, Conservation & Landscapes

HERITAGE, CONSERVATION AND LANDSCAPES (HCL) Policy 10 Liffey Valley and Dodder Valley

HCL10 Objective 3:

"To ensure that development proposals within the Liffey Valley and Dodder Valley, including local and regional networks of walking and cycling routes, maximise the opportunities for enhancement of existing ecological features and protects and incorporates high value natural heritage features including watercourses, wetlands, grasslands, woodlands, mature trees, hedgerows and ditches, as part of the County's Green Infrastructure network".

4.5. The South Dublin Tree Strategy – **Living with Trees (2015-2020)** is also a key consideration where trees are impacted by proposals of development, with guidance in relation to proposals of development as follows:

South Dublin County Council Tree Management Policy – Living with Trees 2015-2020

Chapter 7 | Trees & Development

"Policy: The Council will use its powers to ensure that where it is conducive with the objectives of the County Development Plan, and other planning objectives there is maximum retention of trees on new development sites".

4.6. The South Dublin Development Plan (2016-2022) and South Dublin Tree Strategy – Living with Trees (2015-2020) have influenced the design proposals submitted as part of this application, by ensuring that the existing trees have been considered in the context of planning policy and retained where appropriate.

Tree Preservation Orders & Conservation Areas

4.7. Tree Preservation Orders (TPOs) may be made under Section 45 of the Local Government (Planning and Development) Act, 1963 and subsequent acts. Part XIII of the Planning and Development Act 2000 sets out the provisions for TPOs. A TPO can be made if it appears to the

planning authority to be desirable and appropriate in the interest of amenity or the environment. A TPO can apply to a tree, trees, group of trees or woodland.

4.8. The principle effect of a TPO is to prohibit the cutting down, topping, lopping or wilful destruction of trees without the planning authority's consent. The order can also require the owner and occupier of the land subject to the order to enter into an agreement with the planning authority to ensure the proper management of the tree, trees or woodland.

4.9. A review of the SDCC website did not allow a search for TPOs to be conducted, to ascertain if any TPOs exist upon the Site.

Special Amenity Area Orders

4.10. A National Special Amenity Area is a designation for a landscape of national importance for its aesthetic/recreational value.

4.11. Planning authorities are empowered (under section 202 of the Planning and Development Act 2000), to make a Special Amenity Area Order (SAAO) for reasons of outstanding natural beauty or its special recreational value and having regard to any benefits for nature conservation. The purpose is to preserve/enhance landscape character and to prevent/limit development.

4.12. A review of the South Dublin Development Plan (2016-2022) indicates that the site is not within a SSAO (Figure 2).

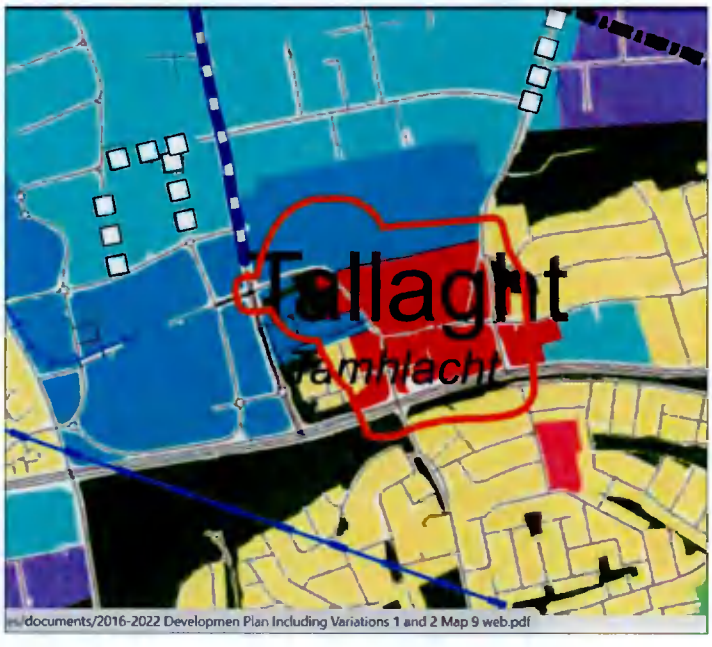


Figure 2. South Dublin Development Plan (2016-2022) that illustrates site is not within a SAAO (Source: Fingal Development Plan 2017-2023).

Felling Licences

4.13. It is an offence for any person to uproot or cut down any tree unless the owner has obtained permission in the form of a felling licence from the Forest Service, with the exception of the following scenarios (under section 19 of the Forestry Act 2014):

- A tree in an urban area. (An urban area is an area that is comprised of a city, town or borough specified in Part 2 of Schedule 5and in Schedule 6 of the Local Government Act 2001, before the enactment of the Local Government Reform Act 2014 (this act

  dissolved Town Councils, however, the old boundaries of these areas are still considered as urban for the purpose of the Forestry Act 2014).
- A tree within 30 metres of a building (other than a wall or temporary structure) but excluding any building built after the trees were planted.
- A tree less than 5 years of age that came about through natural regeneration and removed from a field as part of the normal maintenance of agricultural land (but not where the tree is standing in a hedgerow).
- A tree uprooted in a nursery for the purpose of transplantation.
- A tree of the willow or poplar species planted and maintained solely for fuel under a
- short rotation coppice.
- A tree outside a forest within 10 metres of a public road and which, in the opinion of the owner (being an opinion formed on reasonable grounds), is dangerous to persons using the public road on account of its age or condition.
- A tree outside a forest, the removal of which is specified in a grant of planning permission, providing it was indicated on the lodged plans as being planned for removal as part of the application
- A tree outside a forest of the hawthorn or blackthorn species growing in a hedge.
- A tree outside a forest in a hedgerow and felled for the purposes of its trimming the hedge providing that the tree does not exceed 20 centimetres diameter at 1.3 metres above ground level.
- Agricultural holdings can fell a limited small number of trees not exceeding 3 cubic metres.
- The maximum number of trees permitted to be felled under that exemption per year is 4 trees (12 cubic metres)
- Outside a forest, apple, pear, plum, or damson species are exempt from the need for a felling license.

Wildlife

4.14. The cutting or felling of trees is prohibited during the period 1st April to 31st August every year with limited exceptions under the Wildlife Acts 1976-2008.

5. ARBORICULTURAL IMPACT ASSESSMENT

Development Proposal

5.1. The proposed development will comprise:

a) construction of a 4 storey nursing home building consisting of (i) 106 no. bedrooms (with ensuite); (ii) associated resident's welfare facilities; (iii) administration areas and staff facilities; and pharmacy proposed at ground floor level.

(b) part 4 and part 5 storey Independent Living Units for Older People arranged in 3 Blocks comprising 60 x 2 person/1 bedroom units total.

(c) The development will include communal open space and landscaping (including new tree planting and tree retention), 30 no. car parking spaces; and secure and covered bicycle parking spaces.

(d) The development will be served by a new pedestrian and vehicular access from Old Greenhills Road through existing boundary wall; and

(e) The development includes landscaping, boundary treatments (including walls and railings to southern and western boundaries), an ESB Substation, SuDS drainage; road infrastructure and all ancillary site works necessary to facilitate the development.

Design Principles

5.2. The design layout has been directly and indirectly influenced by the existing tree cover on site. The default position has been to avoid development within the canopy or RPA of any retained tree, however where this has not been possible a hierarchy of mitigation has been applied, as illustrated in Figure 3.

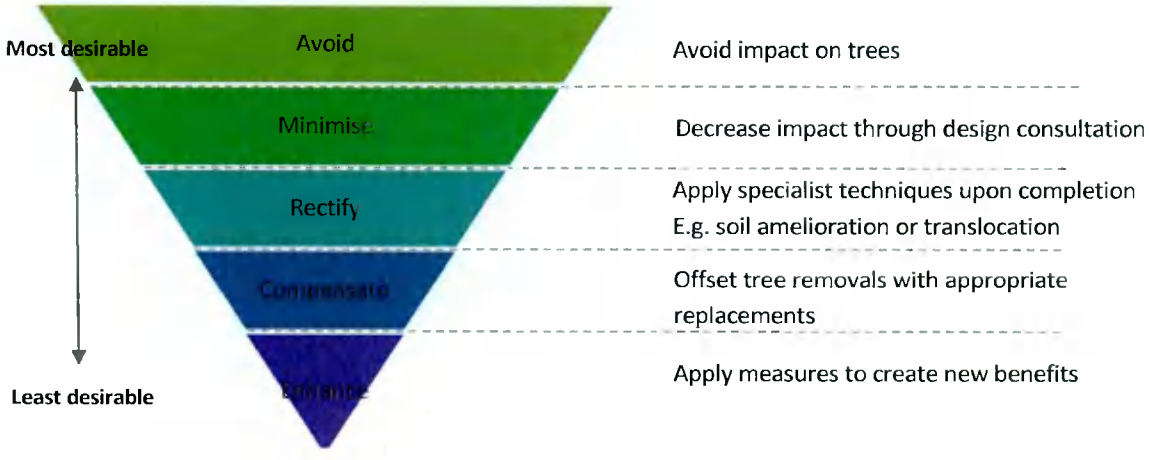


Figure 3. Trees and Development Mitigation Hierarchy (John Morris Arboricultural Consultancy, 2020).

Design Consultation

5.3. Design consultation between the project architect, landscape architect and arboriculturist has ensured mature category A and category B trees in the north west corner of the site have been incorporated into the design proposal. These trees will provide a focal point for the main communal open space.

5.4. Mature trees along the south and west boundary of the site are also proposed to be incorporated into the design layout to provide screening and enclosure to the site, and in recognition of their contribution to the landscape character of the local area.

Tree Removals & Pruning

5.5. Tree removals and pruning have been limited to that which is necessary and unavoidable to allow the development proposal to be implemented, with consideration given to species attributes, the tolerance of individual trees to disturbance, and to the presence of surrounding trees and features of the site which may have an influence on retained trees.

5.6. The pruning of trees may be required for reasons of good arboricultural practice or management to promote tree health and longevity, to remove hazards for reasons of health and safety, or to limit the impacts of the development proposal upon trees where incursions into RPAs are unavoidable.

5.7. The proposal will require the removal of four individual trees and one group of trees.

5.8. A summary of tree removals with reasons for removal and impact of removal, by BS5837 retention category can be found in Table 2.

Table 2. Summary of tree removals and impact of removal.

Tree Nos.	Category	Reason for removal	Impact of removal
4, 9, 10, 11 & G13	Category C	Trees are located within the footprint of the new built environment. The four individual trees (4, 9,10 & 11) are showing signs of physiological and structural decline, with a limited useful life expectancy. The group of trees (G13) have a short life expectancy in an urban	The replacement of these low quality trees will have a positive impact upon the site. A diverse mix of new trees and vegetation will significantly improve species diversity, help to secure a more resilient tree population and significantly increase future canopy cover in the local landscape.

		environment with limited biodiversity value.	
Mitigation measures are proposed to reduce the impact of removals and/or improve the post-development arboricultural, ecological and landscape quality and value of the site (see Mitigation & Improvements).			

5.9. Those trees to be removed are illustrated on the Tree Impact & Protection Plan (TIPP) (Ref: 21-234-03), attached to this report.

5.10. All tree works are outlined in the Tree Schedule attached to this report and should be undertaken by a qualified and insured contractor in accordance with BS3998:2010 *Tree Works – Recommendations.*

Ground Levels & Incursions within RPAs

5.11. There is no requirement for changes in ground levels within the RPA of any retained tree.

Permanent Ground Protection

5.12. The new looping feature pathway and amenity walkway that forms part of the open space to the north west of the site will be constructed within the RPA of existing retained trees of high and moderate arboricultural quality, including tree 3, 5, 6, 7 and 8.

5.13. To reduce the impact upon trees and ensure they remain in good health, it is proposed to utilise 'No-Dig' above ground methods of construction in the form of a three-dimensional cellular confinement system and porous surface finish that will be laid upon the existing ground level. This method of construction will prevent the need to excavate soil to construct a traditional sub-base that would cause significant root disturbance and soil compaction. Instead, the 'No-Dig' system allow the free movement of oxygen and water to soil to support future growth and development ensuring that trees remain in good health.

5.14. Provision of guidance in accordance with industry best practice for working within RPAs including the removal of existing hard surfaces, upgrading existing surfaces, the use of three-dimensional cellular confinement systems, pollution control, installation of services and utilities and landscaping works to ensure that retained trees are protected before, during and after construction are provided in the Arboricultural Method Statements in Chapter 6 of this report.

Construction Phase

5.15. All site compounds, facilities and routes to allow the movement of construction traffic across the Site will be sited outside influencing distance of RPAs for all retained trees.

Mitigation & Improvements

5.16. The aim has been to include those arboricultural features that are capable of providing a substantial future contribution in terms of their amenity, landscape and ecological value,

including those that contribute to the landscape character of the local area.

5.17. To mitigate the removal of low quality arboricultural features with a limited useful life expectancy, it is proposed to plant a diverse mix of new trees and vegetation across the site by way of landscape plan as part of the application.

5.18. This new planting will include a varied age and mix of tree species including native and non-native species that will significantly improve species diversity, increase biodiversity (in recognition of South Dublin Council's partnership status in the All Ireland Pollinator Plan 2015-2020), help to secure a more resilient tree population and significantly increase future canopy cover in the local landscape.

Magnitude of Impact

5.19. The overall magnitude of impact for proposed tree removals has been assessed using the criteria in Table 4.

Table 4. Magnitude of arboricultural impact (John Morris Arboricultural Consultancy 2020).

Magnitude Rating	Description of Impact	Mitigation
High	Major loss or alteration to the main arboricultural features or characteristics of the site that will result in a post-development situation that is significantly different.	Realistic and feasible mitigation measures should be implemented that will reduce the magnitude of impact within a reasonable timeframe and/or create a post-development situation that improves on the pre-development baseline.
Medium	Partial loss or alteration to the main arboricultural features or characteristics of the site that will result in post-development situation that is partially different.	
Low	Minor loss or alteration to the main arboricultural features or characteristics of the site that will result in a post-development situation that is similar to before.	
Negligible	Very minor loss or alteration to the main arboricultural features that will result in a post-development situation that is unchanged.	
None	No loss or alteration to arboricultural features.	

5.20. The proposed layout will require part removal of a main arboricultural features or characteristics of the site and as such the magnitude of impact will range within the category of medium.

5.21. These arboricultural features include low quality trees that are in phycological and structural decline and nearing the end of their useful life expectancy and a group of non-native trees with a short life expectancy and limited biodiversity value.

5.22. The removal of these trees presents an opportunity to introduce new tree planting of better quality that will enhance and improve the future arboricultural quality, amenity value, ecological value and species diversity of trees in the local landscape.

5.23. The benefits provided by this new planting will increase year on year, therefore reducing the magnitude of impact and creating a significant improvement on the pre-development baseline. To accelerate the timeframe over which these benefits are realised, it is proposed to plant extra heavy and semi-mature standards.

6. ARBORICULTURAL METHOD STATEMENTS

Purpose

6.1. The purpose of this statement is to provide a system of working to ensure retained trees are protected at all times during construction. It should be read in conjunction with the Tree Impact & Protection Plan (TIPP) attached to this report.

6.2. A copy of this report must be made permanently available for the duration of the development. It can be:

- Included in tender documents to identify and quantify tree protection and management requirements;
- Used to plan timing of site operations to minimise the impact upon trees, and;
- Referenced on site for practical guidance on how to protect trees.

6.3. The compliance of arboricultural method statements is a recommended as a condition of planning and is necessary to ensure the protection and vitality of retained trees.

Project Arboriculturist

6.1. Due to the nature and extent of works required in proximity to existing trees, it is recommended that a project arboriculturist is appointed for the duration of construction works, to attend site a periodic intervals during keys stages of construction, especially when works are being undertaken that will have a direct impact on trees.

Pre Commencement Meeting

6.2. A pre-commencement meeting will be held prior to commencement of any demolition or construction works on site. The pre-commencement meeting may require the attendance of:

- The Main Works Contractor;
- Landscape Architect;
- Structural/Civil Engineer;
- Project Arboriculturist; and
- Any other parties as required.

6.3. The purpose of this meeting will be to agree the details of the tree protection measures and ensure that all aspects of tree protection are understood. The Project Arboriculturist and Main Works Contractor will agree and mark the location of the tree protective fencing and temporary ground protection and any other specific tree protection measures, as required.

Monitoring

6.4. Once works commence upon the site the role of the project arboriculturists role will switch to monitoring compliance with arboricultural planning conditions, provision of advice in relation to tree related matters and supervision of sensitive works that may impact upon retained trees.

Key Responsibilities

6.5. It is the responsibility of the main contractor to ensure that all site personnel fully understand the protection measures on the site, that tree protection measures are adhered to at all times, and that the project arboriculturist is contacted if there are any issues related to trees.

Tree Protective Fencing

6.6. A protective fence will be erected around retained trees, prior to the commencement of materials or machinery being brought onto site, removal of soil or any form of construction. The area within this fencing will form the construction exclusion zone (CEZ) and it will be afforded protection at all times. No works will be undertaken within this zone that causes compaction to the soil, severance of tree roots or damage to tree canopies.

6.7. The fence is to be sited in accordance with the TIPP attached to this report.

6.8. Details of the minimum distance for fencing from trees can be found in the Tree Schedule attached to this report.

6.9. The precise form of fencing can vary provided it is fit for purpose and prevents damaging activities within the CEZ. For a proposal of this nature, a number of fencing/protection solutions will be required including the Heras 151 system of fencing, timber boards and hessian sacking wrapped in chestnut cleft pale.

6.10. Details of the various types of fencing is provided in Appendix 2.

6.11. The fence will have signs attached to it stating that it defines a CEZ and that no works are permitted beyond it.

6.12. An example of a tree protection sign is provided in Appendix 3.

6.13. The protective fencing may only be removed following completion of all construction works.

6.14. The following principles will be adopted by site personnel within the CEZ during construction, to ensure protection of retained trees:

- No level changes.
- No excavations.
- No fires.

- No use of herbicides.
- No storage of materials, machinery or access for construction workers.

Site Compounds & Facilities

6.15. Site compounds and facilities will be located outside of all RPAs and CEZs as identified on the TIPP.

Site Cranes, Piling Rigs and Machinery

6.16. The location of all site cranes, piling rigs and other machinery should be sited outside of RPAs to avoid soil compaction.

Pollution Control

6.17. Any storage or mixing station located outside of the construction exclusion zone will be located in a place that minimises the risk of contaminated runoff entering to prevent adverse physiological impacts on trees that may result from contact with rooting environments. This may be achieved by using a non-permeable membrane on the ground, surrounded by sandbags or sawdust to contain any spillage.

Temporary Ground Protection

6.18. Where it is not practical to protect RPAs by use of protective fencing, BS5837 allows for the fencing to be set back and the soil shielded by ground protection. A range of methods can be used including retaining existing hard surfaces or structures that already protect the soil, installing new temporary surfaces, or a combination of both. Whatever the choice of method, the end result must be that the underlying soil remains undisturbed and retains the capacity to support existing and new roots.

6.19. If fences are to be set back on a temporary the following specifications are recommended for use as temporary ground protection to protect roots and soil.

6.20. For pedestrian traffic, a plywood board with a minimum thickness of 40mm should be laid on a minimum of 100mm deep woodchip, with geotextile membrane beneath.

6.21. For small plant machinery with a gross weight of up to 2 tonne, interlinking aluminium or composite tracks with sufficient load bearing capacity should be laid on a minimum of 150mm deep woodchip, with geotextile membrane beneath.

6.22. For heavy machinery with a gross weight of up to 3.5tonne, interlinking aluminium or composite track with sufficient load bearing capacity should be laid over a minimum layer of 200mm deep woodchip, with a geotextile membrane beneath.

6.23. An example of temporary ground protection measures can be found in Appendix 4.

6.24. Any temporary protective surfaces must remain in place until all construction activity is finished.

6.25. Upon completion of construction works, the temporary ground protective measures should be removed working backwards from on top of the system. This will need to be done carefully to

ensure that there is no excavation or compaction of the original surface or change in ground levels.

6.26. Once this material has been removed vehicular access to this part of the site will not be permitted.

6.27. The location of where temporary ground protection is to be located and at what stage of development is illustrated on the TIPP attached to this report.

Permanent Ground Protection

6.28. Where permanent hard surfaces are required within the RPA, there must be no excavation into the soil, either through the lowering of levels and/or scraping, other than the removal of turf or other surface vegetation, using hand tools only.

6.29. A 'No-dig' solution should be implemented in accordance with industry best practice and in particular with reference to Arboricultural Practice Note 12 (APN12) which provides details of the 'No-dig' method of construction. The area directly beneath the finished hard surface and on top of the RPA should be protected by the installation of a three-dimensional cellular confinement system, or a suitable alternative solution (e.g. pile and beam, screw piles or other root bridging technique) as specified by the project structural engineer.

6.30. The suitability and type of permanent ground protection required will depend on the existing properties and load bearing capacity of the soil, and the future use and load bearing capacity requirements of the site and should therefore be specified by the project structural engineer.

Three-Dimensional Cellular Confinement Systems

6.31. This is a load bearing system which protects roots from the effects of compaction from regular vehicular, cycle or pedestrian movement. A range of products are offered by various manufacturers but whatever system is used, the end result must be that the underlying soil or rooting environment remains undisturbed and retains the capacity to support existing and new root growth.

6.32. Details of three-dimensional cellular confinement system and general guidance on its installation can be found in Appendix 5. It will be the responsibility of the contractor to ensure that whatever system is used, it is installed in accordance with the latest guidelines provided by the relevant manufacturer.

Installation of Lighting Columns / Railings / Fences

6.33. The erection of a new posts or lighting columns will require 'hand-digging' in the location where any foundations or posts are required within RPAs, to prevent damage to tree roots.

6.34. Any soil removal during excavations must be undertaken with care to minimise root disturbance and avoid any damage to root bark.

6.35. Exposed roots that are to be removed should be cut cleanly with a sharp saw or secateurs 10-20mm behind the final face of the excavation.

6.36. Roots greater than 25mm diameter should only be cut in exceptional circumstances and following approval by the project arboriculturist.

6.37. Fibrous clumps of roots must be retained where possible, with any exposed roots protected from desiccation by covering them with a damp hessian sack or damp sharp sand (**builders' sand must not be used**).

6.38. Prior to backfilling, roots must be surrounded with topsoil or sharp sand before the excavated earth is replaced. The soil must be free of contaminates and any foreign objects that may be potentially harmful to roots.

Installation of Services

6.39. All services and utilities will be installed within existing service routes and where possible outside of RPAs.

6.40. Where installation of utilities or services is required within RPAs, working practices will be adopted in accordance with the National Joint Utilities (NJUG) 10, Vol 4, Issue 2, 2007 'Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees'.

6.41. In accordance with 4.1.3 of NJUG 10 2007, acceptable techniques in order of preference include: a) Trenchless; b) Broken Trench; and c) Continuous Trench. Trenchless methods involve the use of thrust boring machinery, whilst broken and continuous trench methods require that excavations within RPAs are carried out using hand tools only.

6.42. For a proposal of this nature, broken or continuous trench methods are the most appropriate and should be employed as per NJUG 10, to prevent any damage to tree roots or disruption to soil rooting environments.

Soft Landscaping

6.43. To avoid damage to existing tree roots and prevent soil compact, any machinery used to remove existing surfaces and ground vegetation for purposes of soft landscaping (e.g. seeding new lawns or laying turf) should be sited outside of RPAs. If this is not possible, hand tools must be used.

6.44. The removal of the surface layer within RPAs must not exceed 50mm, to prevent exposure and damage of tree roots beneath.

6.45. Soft landscaping works must not involve raising or lowering of the existing ground level within any RPA as this can starve roots of oxygen and cause irreversible physiological damage to trees.

6.46. The use of rotavators within RPAs is prohibited.

6.47. Any level changes outside RPAs must be graded to marry existing soil levels within RPAs.

Excavations and Removal of Existing Surfaces

6.48. All excavation must be carried out carefully using spades, forks and trowels, taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air such as an Air Spade may be an appropriate alternative to hand digging, if available.

6.49. All soil removal must be undertaken with care to minimise the disturbance of roots beyond the immediate area of excavation. Where possible, flexible clumps of small roots, including fibrous roots, should be retained if they can be displaced temporarily or permanently beyond the excavation without damage.

6.50. If digging by hand, a fork should be used to loosen the soil and help locate any substantial roots. Once the roots have been located the trowel should be used to clear the soil away from them without damaging the bark. Exposed roots that are to be removed should be cut cleanly with a sharp saw or secateurs 100-200mm behind the final face of the excavation.

6.51. Roots temporarily exposed must be protected from direct sunlight, drying out and extreme temperatures by appropriate covering. Roots greater than 25mm in diameter should only be cut in exceptional circumstances. Roots greater than 100mm in diameter should only be cut after consultation with the project arboriculturist.

Upgrading Existing Surfaces

6.52. Where upgrading of existing hard surfaces is required, the preferred option will be to leave the surface in place and install the new surface specification on top.

6.53. If the retained surface is impermeable, it may be appropriate to remove or puncture sections to create a more favourable environment for roots beneath, before the new surface is laid, through consultation with the project arboriculturist.

6.54. Where the existing surface is to be removed or upgraded, the surface layer should be excavated down the existing subbase and the new surface specification installed on top, to prevent any damage to roots beneath.

6.55. It is recommended that where possible, new and upgraded hard surfaces should be porous (e.g. permeable brick paving, porous resin bound aggregate or tarmac) to allow the flow or water and oxygen to roots. Wet concrete should only be poured if an impermeable geotextile fabric has first been installed to prevent soil contamination from toxic leachate.

6.56. New surfaces and upgraded surfaces should be set back from the base of stems by a minimum of 50mm to allow space for future growth and minimise the risk of distortion with new surface.

7. ABOUT THE AUTHOR & LIMITATIONS

Authors Qualifications & Experience

7.1. This report has been written by John Morris, Director and Principal Arboricultural Consultant at John Morris Arboricultural Consultancy Ltd. John has a First Class BSc (Hons) in Housing (Ulster

University) and a Post Graduate Diploma (UK NQF Level 7) in Arboriculture & Urban Forestry (Myerscough College & University of Central Lancashire). John has worked in the housing, development and arboricultural sectors combined for over 15 years and regularly undertakes continuous professional development (CPD) in all areas of arboriculture and wider business administration. John is a Professional member of the Arboricultural Association (AA), Associate member of the Institute of Chartered Foresters (ICF) and Chartered member of the Institute of Housing (CIH).

Limitations

7.2. This report is for planning purposes and is not a detailed assessment of the health and condition of trees, however where defects have been identified works have been recommended to ensure site safety.

7.3. This report does not take responsibility for the effects of extreme weather conditions, vandalism, accidents or any works to trees that occur without the authors knowledge, or that are not recommended within this report.

7.4. Tools used during the assessment have been limited to a sounding mallet, probe or binoculars.

7.5. No invasive or diagnostic equipment has been used, nor have any aerial inspections, belowground root investigations, or soil, leaf or root samples been taken for further testing or analysis.

7.6. Trees were assessed during a single visit conducted on 14th October 2020 and the information gathered during the survey pertains to that moment in time.

7.7. The observations within this report will remain valid for two years from the date of inspection.

7.8. The location of trees places reliance on the accuracy of the topographical survey unless otherwise caveated within the report.

7.9. All works recommendation as a result of the survey should be undertaken by a suitably qualified and insured arborist in accordance with BS3998:2020 *Tree Works – Recommendations* to prevent any structural or physiological impairment to trees.

Appendices

Appendix 1: Tree Survey Criteria (BS5837:2012)

The assessment of the trees has been carried out in accordance with the guidance provided in Annexe C of BS5837, which requires that any tree on or influencing distance of the site with a stem diameter of over 75mm at 1.5m above ground level be recorded.

Stem diameter measurements were taken using a girthing tape or Biltmore stick, and in accordance with Annexe D of BS5837.

Height, crown spread, and canopy clearance measurements are recorded in accordance with the measurement convention detailed in paragraph 4.4.2.6 of BS5837.

The trees are categorised in an order defined in **Table 1** of BS5837, a copy of which can be seen below in **Figure 1**, but which can be summarised as:

- **Category A** Trees of high quality and value in such a condition as to be able to make a substantial contribution for a minimum of 40 years.
- **Category B** Trees of moderate quality and value in such a condition as to make a significant contribution for a minimum 20 years.
- **Category C** Trees of low quality and value currently in adequate condition and able to remain until new planting can be established with a minimum useful life expectancy of 10 years, and young trees with a stem diameter less than 150mm.
- **Category U** Trees in poor structural condition or physiological decline that cannot be realistically retained in the context of current land use for more than 10 years.

Further subcategories 1-3 indicate the area(s) in which a tree or group retention value lies.

- Mainly arboricultural.
- Mainly landscape.
- Mainly cultural, including conservation.

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
Category U Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	• Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning) • Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline • Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality *NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.*			See Table 2
	1 Mainly arboricultural qualities	**2 Mainly landscape qualities**	**3 Mainly cultural values, including conservation**	
Trees to be considered for retention				
Category A **Trees of high quality** with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
Category B **Trees of moderate quality** with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
Category C **Trees of low quality** with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2

Appendix 2 – Calculation of the Root Protection Area

Circle Radius

The circle radius has been calculated by obtaining the stem diameter (measured at 1.5m above the ground) in millimetres and multiplying it by 12. Where the tree is multi-stemmed, an average stem diameter is calculated by the following formula specified in section 4.6.1 (a) & (b) of BS5837.

For trees with two to five stems, the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{stem diameter 1})^2 + (\text{stem diameter 2})^2 \ldots + (\text{stem diameter 5})^2}$$

For trees with more than five stems (not illustrated in Annex C), the combined stem diameter should be calculated as follows:

$$\sqrt{(\text{mean stem diameter})^2 \times \text{number of stems}}$$

This total is then divided by 1000 to provide a circle radius in metres.

RPA Areas

The RPA has been assessed according to the recommendations set out in section 4.6 of BS5837. It is calculated by multiplying the radius squared by 3.142 (π).

Length of sides of a square

Section 5.5.3 of BS5837 recommends that the ground protection and barriers should be shown as a polygon surrounding the stem of the tree. With a circle, the distance from the edge of the circle to the centre will remain constant, but with a square, the distance from the centre of the tree to the sides of the square is less than the distance to the corner of the square. The area of the square must remain the same as the area of the circle. In order to ensure that it is
the case, the length of side of the square is calculated at the square root of the RPA area.

Minimum barrier distance

This is the closest point that a side of the square can be to the centre of the tree.

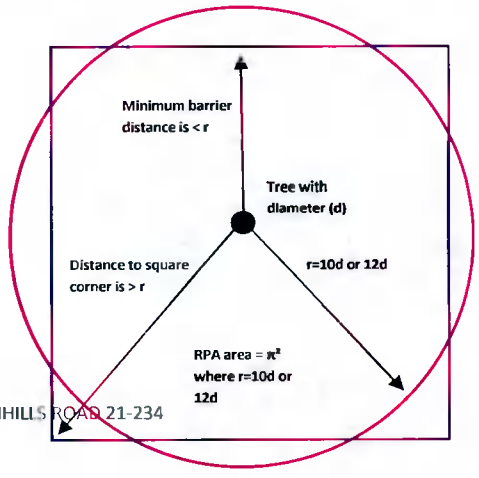


Figure 1. Illustration of area calculations and minimum barrier distances

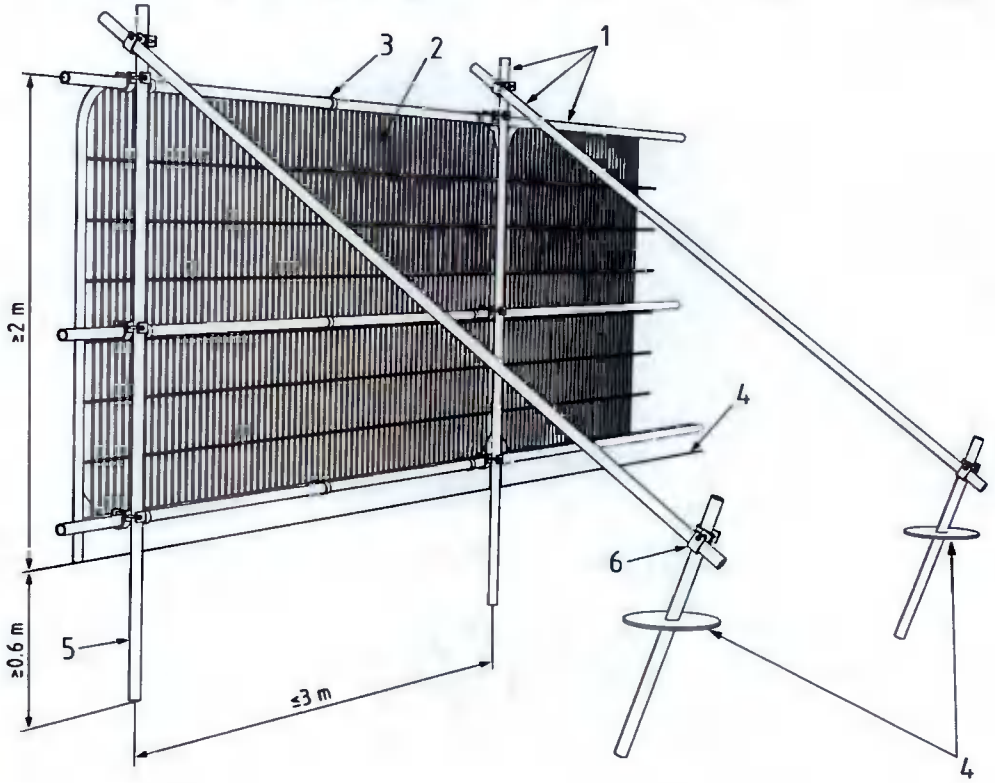
Figure 1 illustrates the differences between a square and a circle in area. Where the distance from the centre of the tree to the corner of the square is greater than the radius of the circle (r), but the distance from the centre of the tree to the side of the square is greater than the radius of the circle (r), the total area will remain the same. The minimum barrier distance from
the tree is calculated by taking the length of the side and dividing it by two.

Clarification note on the RPA radius

The RPA radius is not the automatic minimum distance of the tree protection. It is a notional figure for use as a means of calculating the actual area of the RPA. BS5837 clarifies this under *Section 3.7 Root Protection Area (RPA) – layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the trees viability, and where the protection of the roots and soil structure is treated as a priority.*

Appendix 3 – Example of Tree Protective Fencing

Figure 2 **Default specification for protective barrier**



Key

1 Standard scaffold poles
2 Heavy gauge 2 m tall galvanized tube and welded mesh infill panels
3 Panels secured to uprights and cross-members with wire ties
4 Ground level
5 Uprights driven into the ground until secure (minimum depth 0.6 m)
6 Standard scaffold clamps

Appendix 4 – Example of Tree Protective Signs

Appendix 5 – Example of Temporary Ground Protection

DuraDeck

PRODUCT SPECIFICATIONS

DD1

Traction Surface: **Double-traction tread design includes two parallel traction treads positioned at 90 degrees to adjacent double traction tread sets.**

Module Size:
Length: 8' / 2.44 m
Width: 4' / 1.22 m
Module Size: 32 sq/ft / 2.973 sq/meters
Thickness: ½" thick mat + 3/8" cleat

Module Weight: 86 lbs. / 39.01 kg.
Per Square Foot: 2.69 lbs. / 43 oz. / 1.22 kg. / 1219 grams
Per Square Meter: 28.60 lbs. / 12.97 kg.

Colors: Black, White.
Custom colors available (minimum order required).

Material: Black High-Density Polyethylene (HDPE) post-industrial recycled plastic, naturally UV resistant due to the carbon black used for color. White mats available.

Test Results:

	ASTM	Units	Typical Values
Melt Index	D 1238	g/10min	4.9
Density	D 792	g/cm³	.960
Tensile Strength @ Yield 50mm/min	D 638	mpa (psi)	30 (4,350)
Elongation @ Break 50mm/min	D 638	%	1 500
Flexural Modulus	D 790	mpa (psi)	1 240 (180,000)
Hardness, Shore D	D 2240	–	70
Compressive Strength:		D695-02a	psi 2,843
Flammability Resistance:	UL-94 HB		Passed

Tread Pattern: **DD1:** Rugged double-traction tread on both sides

Support Structure: Matting incorporates multi-directional structural support (cleat design) allowing for distribution or dispersion of PSI weight factors. Not intended for bridging.

Weight Loading: Varies, depending on sub-surface, up to 80 tons capacity.

Ground Surface: DuraDeck mats are designed to be used with no ground preparation over grass, gravel, soil, concrete, asphalt, mud and sandy soil conditions.

Connection System: DuraDeck mats have eight holes: one in each corner and four in the center line (two on each 8ft side) to create multi-directional roadways of nearly any size or shape. Mats can be connected using metal DuraLink connectors. DuraLinks do not require tools to install.

Shipping: Pallet maximum is 50 units (4' x 8')
20' Ocean Container: 250 – 4' x 8' unit order and/or equal to 29,240 lbs.
40' Ocean Container: 500 – 4' x 8' unit order and/or equal to 43,000 lbs.

Warranty: 7 years against cracking and breaking under normal use.

Appendix 6 – Guidance on Three-Dimensional Cellular Confinement Systems

Preparation

During the preparation stages it is important to consider any activity that may cause damage to tree roots or soils beneath, resulting in compaction and therefore an increase in bulk density that could result in oxygen depletion and reduction in soil water availability. The clearance of vegetation could also result in direct damage to rook bark or severance of roots that are vital for tree survival.

The location and movement of site traffic should therefore give due consideration to ensure roots and soils do not undergo any form or compaction, or excess excavation of earth to remove any surface vegetation. Further risk factors include the creation of an imperviable surface, causing a rise in the water table due to construction, increasing ground levels and contamination of sub soils.

When looking at site conditions and future use requirements, the following information should be considered to enable a load bearing structure capable of supporting proposed traffic:

- Californian Bearing ratio (CBR) – Standard test method for measuring soil strength
- Soil types
- Water table
- Maximum load requirements
- Acceptable rut depth
- Reinforcement type (I.e. depth of three-dimensional cellular confinement system)
- Type and depth of engineered infill material (E.g. Clean, angular stone, usually 40mm to 20mm).

Excavations

The precise location and depth of roots within the soil is unpredictable and can only be established once digging has commenced. Ideally, all RPAs should be no-dig, but this is often not possible on undulating surfaces. New surfacing normally requires an evenly graded sub-base layer, which can be made up to high points with granular, permeable fills such as crushed stone or sharp sand. This sub-base must not be compacted. Some limited excavation may be required to achieve this, and this is not necessarily damaging to trees if it is done carefully and no large roots are cut. The top 50mm of soil on grass surfaces is unlikely to contain any tree roots and therefore the removal of this will not impact the tree. It may be possible to dig deeper than this depending on local conditions, but this would need to be assessed by the retained project arboriculturist.

On undulating surfaces, finished gradients/levels must be planned with sufficient flexibility so as to allow changes to occur if the excavation of high points reveals unexpected large roots. If roots are less than 25mm in diameter, it would normally be acceptable to cut these. However, for roots over

25mm diameter, cutting them may cause damage to the tree and further excavation may not be possible. In this case, the surrounding levels must be adjusted to take account of these high points, by filling with suitable material. If this is not possible and it is necessary to cut larger roots, discussions should be held with the retained project arboriculturist before any final decision is made.

Installation

Generally, it is best practice to place a geotextile separation filtration layer over the prepared sub-grade and overlap dry joints by 300mm.

The three-dimensional cellular confinement system should be expanded to the full length, with panels secured in place using staking pins to anchor open the cells. Adjacent panels should be stapled together to create a continuous mattress and the structure infilled with a no fines angular granular fill (typically 4-20mm) within each open cell.

A treated timber edging is usually acceptable for an edge restraint, however other suitable materials may include railway sleepers or metal pins.

Surfacing Options

Generally, a variety of surface finishes can be installed including block paving, gravel, tarmac and concrete but will depend on the individual manufacturer's specification and product requirements.

Appendix 7 – Example of Three-Dimensional Cellular Confinement System

CellWeb™

Tree Root Protection System



The CellWeb™ TRP cellular confinement system protects tree roots from the damaging effects of compaction and desiccation, while creating a stable, load-bearing surface for vehicular traffic.

Potential loss of existing tree due to poor construction techniques

CellWeb™ offers an alternative to the traditional methods of constructing roadways and building foundations that involve excavation, which can result in tree root severance and soil compaction from the passage of vehicles. Such damage can severely influence tree health and in extreme cases leads to death. CellWeb™ can be sensitively installed close to and under the canopies of trees without negative effects.

Trees are valuable landscape features and a vital environmental resource. Increasingly, contractors are being required to ensure the health and survival of trees during and beyond the construction period. Although this is enshrined in BS 5837: Trees in Relation to Construction: Recommendations (2005) and Tree Preservation Order legislation, it presents several issues when implementing construction projects near to trees:

- Root severance caused by excavation, leaving trees open to decay, less stable and with a diminished capacity to utilise soil water and nutrients.
- Destruction of soil structure and compaction due to the passage of heavy vehicles, restricting the flow of water and air to tree roots.
- Need for construction access, new roadways and hard surfaces that require engineering-standard load-bearing foundations that meet building regulations
- Need for high-performance, cost-effective driveways and roadways in the vicinity of tree roots.

The CellWeb™ system overcomes these issues and helps contractors to comply with tree health guidelines by creating a load-bearing base that is water-permeable, stable and durable.

With no need for excavation, the system is quick and easy to install, reducing construction time and saving costs and making it suitable for temporary and permanent solutions.

Clyrebourne Wood.

Pedestrian path to recreational wood and built using a CellWeb™ foundation which was covered with Duoblock and then filled with woodchip to create a porous surface.

Product features

CellWeb™ comprises an expandable cellular mattress that is then filled with a clean stone sub-base and above a Treetex T300 Geotextile.

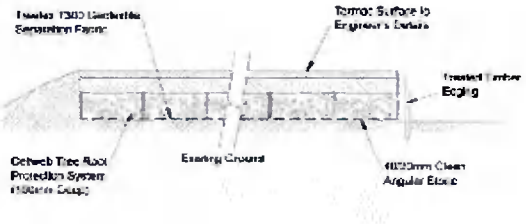
The honeycomb like structure is made of robust high density polyethylene (HDPE) that is simply stretched out and filled with clean angular material. Just like traditional roadways, the strength of the structure comes from the binding together of the infill, but with CellWeb™ this is achieved without compaction and without reduction in permeability.

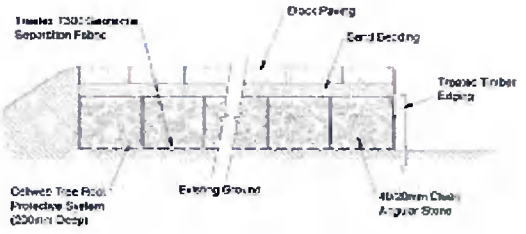
Perforated cell walls allow the angular infill to bind with the contents of the adjacent cell, but with sufficient space for the movement of water and air to nearby tree roots. As the infill contains no fines and the geotextile layers prevent clogging from particles washing into the system, the structure remains permeable to water over time and protects the roots for the lifetime of the tree.

As well as being quick and easy to install, CellWeb™ also dramatically cuts down the depth of sub-base required, in most cases by as much as 50%, further reducing costs. CellWeb™ significantly reduces surface rutting, increasing the long term performance of the finished surface and ensuring that tree roots remain protected from vertical loads.

CellWeb can be used as a permanent solution or alternatively the system can be used in a temporary situation. In a temporary application the system can be used for the required period of time, then removed for use on another site or recycled, thereby adding to CellWeb's green credentials.

- No excavation – Soil structure remains undisturbed; risk of root damage minimised.
- Porous infill – Allows tree roots to conduct moisture and gas exchange.
- No compaction – No need to compact the infill to achieve a load-bearing structure.
- Lateral stability – Structure remains rigid to vertical loads.





Please call
01455 617 139
or email sales@geosyn.co.uk
for further information

Wide product range

Large stock holding

Next day delivery